

BUILDING AUTOMATION COMPETENCE CENTER EUROPE

# ClimaECO – Boiler-/Chiller Interface BCI/S

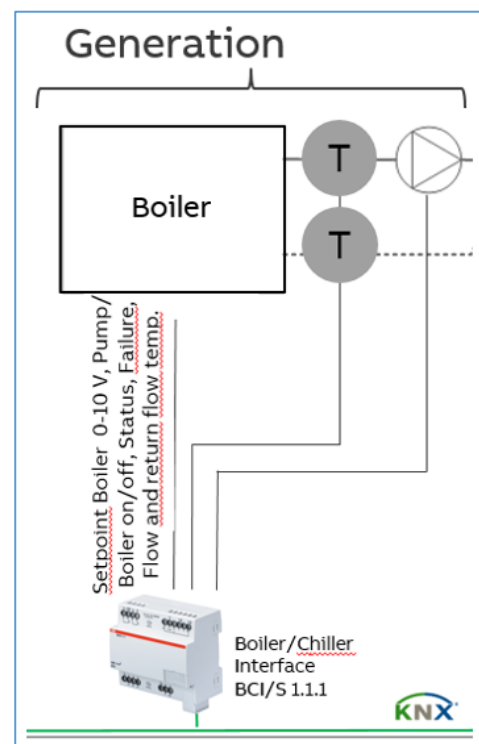
## Boards:

Outputs: Capital letters

Inputs: small letters

## Exercise:

With the Boiler-/Chiller Interface BCI/S 1.1.1 the control of a Boiler shall be done.



Parameterize the following functions for the pump, activate all related inputs to monitor the pump (status, error, repair switch):

3.3.10 Training BCI/S1.1.1 boiler/chiller interface,MDRC > Pump > Pump

General	Automatically switch on pump when generator is in activation range <span style="float: right;"><input type="radio"/> No <input checked="" type="radio"/> Yes</span>
Application	Run-on time <span style="float: right;">00:00:05 <small>hh:mm:ss</small></span>
Device function	Activate manual pump overdrive via group object <span style="float: right;"><input checked="" type="radio"/> No <input type="radio"/> Yes</span>
Monitoring and safety	
Pump	Monitor pump status <span style="float: right;"><input type="radio"/> Deactivated <input checked="" type="radio"/> Via physical device input</span>
Pump	Note: Configuration in parameter window 'c: Binary input'
Pump	Monitor pump error <span style="float: right;">Via physical device input ▼</span>
Generator activation	Note: Configuration in parameter window 'd: Binary input'
Generator signal	Monitor pump repair switch <span style="float: right;">Via physical device input ▼</span>
Generator relay	Note: Configuration in parameter window 'e: Binary input'
Inputs	Send status value <span style="float: right;">After a change or request ▼</span>

Parameterize the following functions for the generator, activate all related inputs to monitor the generator (status, error):

3.3.10 Training BCI/S1.1.1 boiler/chiller interface,MDRC > Generator activation > Generator signal

<div style="background-color: #f0f0f0; padding: 2px 5px;">General</div> <div style="background-color: #f0f0f0; padding: 2px 5px;">Application</div> <div style="background-color: #f0f0f0; padding: 2px 5px;">Device function</div> <div style="background-color: #f0f0f0; padding: 2px 5px;">Monitoring and safety</div> <div style="background-color: #f0f0f0; padding: 2px 5px;">Pump</div> <div style="background-color: #f0f0f0; padding: 2px 5px;">Pump</div> <div style="background-color: #f0f0f0; padding: 2px 5px;">Generator activation</div> <div style="background-color: #e0f0ff; padding: 2px 5px;">Generator signal</div> <div style="background-color: #f0f0f0; padding: 2px 5px;">Generator relay</div> <div style="background-color: #f0f0f0; padding: 2px 5px;">Inputs</div> <div style="background-color: #f0f0f0; padding: 2px 5px;">a: Supply temperature</div> <div style="background-color: #f0f0f0; padding: 2px 5px;">b: Return temperature</div> <div style="background-color: #f0f0f0; padding: 2px 5px;">c: Binary input</div> <div style="background-color: #f0f0f0; padding: 2px 5px;">d: Binary input</div> <div style="background-color: #f0f0f0; padding: 2px 5px;">e: Binary input</div> <div style="background-color: #f0f0f0; padding: 2px 5px;">f: Binary input</div> <div style="background-color: #f0f0f0; padding: 2px 5px;">g: Binary input</div>	<div style="margin-bottom: 10px;"> Type of generator activation <span style="float: right;">Absolute temperature ▼</span> </div> <div style="margin-bottom: 10px;"> <p>Caution! The following voltage ranges must not overlap.</p> <div style="display: flex; justify-content: space-between;"> <div>Minimum output voltage - failure</div> <div>0</div> <div>V</div> </div> <div style="display: flex; justify-content: space-between;"> <div>Maximum output voltage - failure</div> <div>2</div> <div>V</div> </div> </div> <div style="margin-bottom: 10px;"> <div style="display: flex; justify-content: space-between;"> <div>Min. output voltage for generator Off</div> <div>2.1</div> <div>V</div> </div> <div style="display: flex; justify-content: space-between;"> <div>Max. output voltage for generator Off</div> <div>4</div> <div>V</div> </div> <div style="display: flex; justify-content: space-between;"> <div>Min. voltage for generator activation</div> <div></div> <div></div> </div> <div style="display: flex; justify-content: space-between;"> <div>Maximum voltage for generator activation</div> <div>8</div> <div>V</div> </div> </div> <div style="margin-bottom: 10px;"> <div style="display: flex; justify-content: space-between;"> <div>Signal output (voltage to temperature/power)</div> <div> <input checked="" type="radio"/> Normal <input type="radio"/> Inverted </div> </div> </div> <div style="margin-bottom: 10px;"> <div style="display: flex; justify-content: space-between;"> <div>Lower temperature limit for generator activation</div> <div>25</div> <div>°C</div> </div> </div> <div style="margin-bottom: 10px;"> <div style="display: flex; justify-content: space-between;"> <div>Upper temperature limit for generator activation</div> <div>60</div> <div>°C</div> </div> </div> <div style="margin-bottom: 10px;"> <div style="display: flex; justify-content: space-between;"> <div>Use of relay output for generator activation</div> <div> <input type="radio"/> No <input checked="" type="radio"/> Yes </div> </div> </div> <div style="margin-bottom: 10px;"> <div style="display: flex; justify-content: space-between;"> <div>Monitor generator status</div> <div> <input type="radio"/> Deactivated <input checked="" type="radio"/> Via physical device input </div> </div> <p style="font-size: 0.8em; margin-top: 5px;">Note: Configuration in parameter window 'f: Binary input'</p> </div> <div style="margin-bottom: 10px;"> <div style="display: flex; justify-content: space-between;"> <div>Monitor generator error</div> <div>Via physical device input ▼</div> </div> <p style="font-size: 0.8em; margin-top: 5px;">Note: Configuration in parameter window 'g: Binary input'</p> </div> <div style="margin-bottom: 10px;"> <div style="display: flex; justify-content: space-between;"> <div>Activate generator overdrive via group object</div> <div> <input checked="" type="radio"/> No <input type="radio"/> Yes </div> </div> </div>
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The parametrization of 0-10 V signal shall work as follows:

0 V: Min. output voltage failure

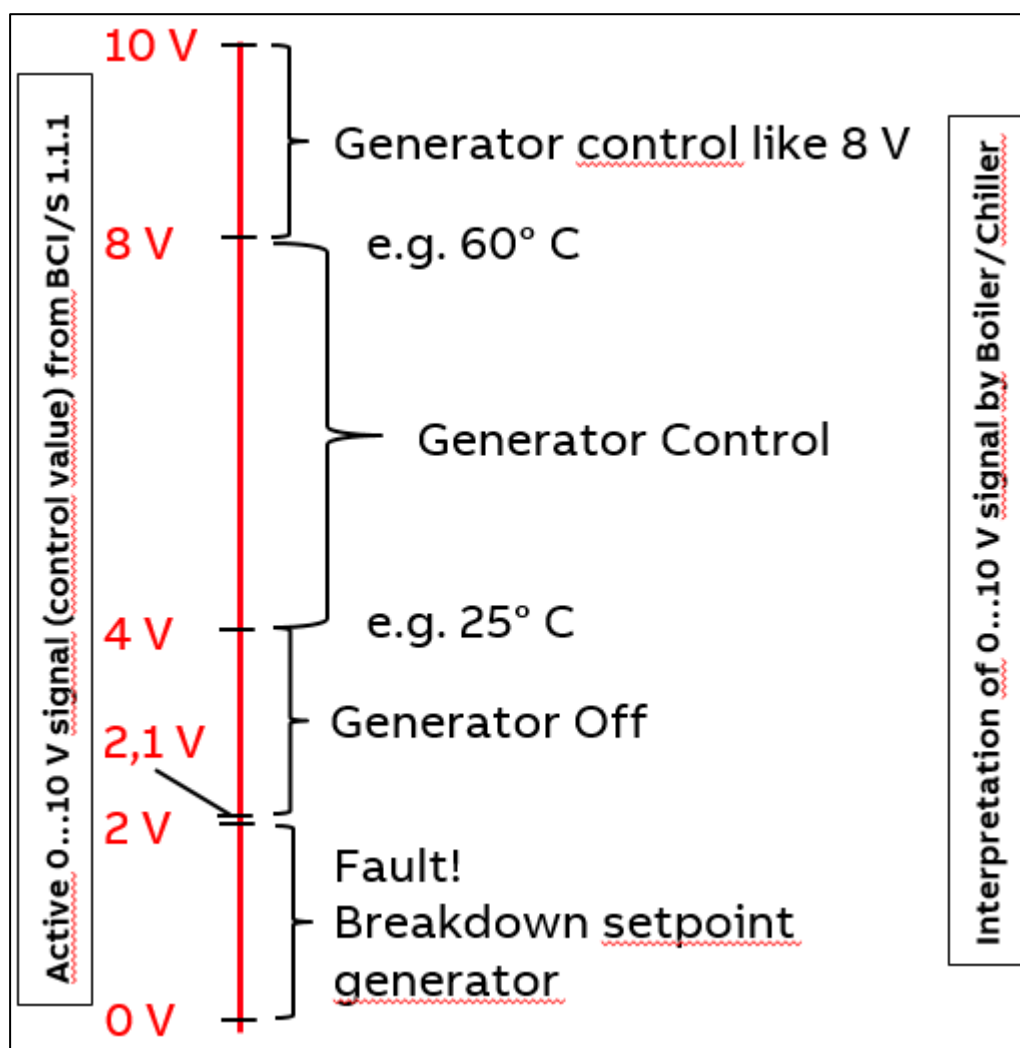
2 V: Max. output voltage failure

2.1 V: Min. output voltage for generator off  
(2 V + 0.1 V)

4 V: Max. output voltage for generator off  
Min. voltage for generator activation

In case of calculated value between 2.1 V and 4 V fixed mean value is active from BCI/S →  $(2.1 + 4) : 2 = 3.05 \text{ V}$

8 V: Max. voltage for generator control



## ABB i-bus tool

Start the ABB i-bus tool and connect to the BCI/S via the physical address.

- Adjust the setpoint temperature of the heating circuit via i-bus tool. Check the values below for output signal 0-10V visible in i-bus tool and pointer instrument whether it is in compliance with expected values shown in the diagram above.

Setpoint	Generator control value shown in i-bus tool / Pointer Instrument
10°	
26°	
40°	
80°	

- Check whether the pump is switched on automatically when generator is activation range
- Check whether the pump switches off with 5 s run-on time when generator is outside activation range
- Adjust a valid setpoint for generator and simulate status running for generator (input f) and pump (input c)
- Simulate generator error (input g) and see the reaction in i-bus tool, e.g. pump or generator control value
- Simulate pump error or active repair switch and see the reaction in i-bus tool
- Change flow temperature via potentiometer to different values, what happens?

Parameterize the forced operation as shown above.

3.3.10 Training BCI/S1.1.1 boiler/chiller interface,MDRC > Application > Monitoring and safety

General
Application
Device function
Monitoring and safety
Pump
Generator activation

Caution!

Its is important to note the parameter settings in the 'Generator signal' parameter window. They influence the parameters in this window.

Use forced operation Forced operation, 1 bit; 1 active

Generator state ☒ Switching on ☐ Switch off

Setpoint generator signal 50 °C

Pump status Switch on pump

Use input e as normal binary input (instead of pump repair switch) and assign group addresses as follows:

37	Switch	Channel - Binary input e	Forced operation	4/4/1	1 bit
39	Generator operating status	Channel - Binary input f			1 bit
41	Generator error alarm	Channel - Binary input g			1 bit
11	Forced operation, 1 bit	Channel - General	Forced operation	4/4/1	1 bit

Check the function in ABB i-bus tool.